

GUIDELINES FOR THE HANDLING OF RUBBER-LINES CELL PARTS POTENTIALLY CONTAMINATED WITH MERCURY

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1. INTRODUCTION

1.1 SCOPE

This pamphlet provides guidance for the handling of rubber-lined cell parts potentially contaminated with mercury to help ensure that personnel involved in rubber-lining removal are not exposed to potentially harmful concentrations of mercury. Rubber-lined cell parts used in the mercury cell process may be contaminated with mercury. Such contamination may be present even if mercury is not visible.

While rubber-lined cell parts are undergoing repair, whether at the chlor-alkali production facility or an off-site facility, formal procedures and appropriate personal protective equipment need to be in place and utilized to protect maintenance personnel from being exposed to potentially harmful levels of mercury. This pamphlet provides guidance and recommendations for the protection of such personnel.

This pamphlet does not address components of the rubber lining or contaminants other than mercury that might be present in the rubber lining or may be generated during the repair process.

1.2 RESPONSIBLE CARE

The Institute is a Chemical Manufacturers Association (CMA) Responsible Care® Partnership Association. In this capacity, the Institute is committed to: Fostering the adoption by its members of the Codes of Management Practices; facilitating their implementation; and encouraging members to join the Responsible Care® initiative directly.

Chlorine Institute members who are not CMA members are encouraged to follow the elements of similar responsible care programs through other associations such as the National Association of Chemical Distributors' (NACD) Responsible Distribution Program or the Canadian Chemical Manufacturers Association's Responsible Care® program.

1.3 DEFINITIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOT	U.S. Department of Transportation
HAZCOM	Hazard Communication Programs
MSDS	Material Safety Data Sheet

PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
TCLP	Toxicity Characteristic Leaching Procedure

1.4 DISCLAIMER

The information in the pamphlet is drawn from sources believed to be reliable. The Institute and its members, jointly and severally, make no guarantee and assume no liability in connection with any of this information. Moreover, it should not be assumed that every acceptable procedure is included or that special circumstances may not warrant modified or additional procedures. The user should be aware that changing technology or regulations may require a change in the recommendations herein. Appropriate steps should be taken to ensure that the information is current when used. These recommendations should not be confused with federal, state, provincial, municipal or insurance requirements, or with national safety codes.

1.5 APPROVAL

The Institute's Board Committee on Mercury Issues approved Edition 1 of this pamphlet on January 8, 1998.

1.6 REVISIONS

Suggestions for revisions should be directed to the Secretary of the Institute.

1.7 REPRODUCTION

The contents of this pamphlet are not to be copied for publication, in whole or in part, without prior Institute permission.

2. **POLICY RECOMMENDATIONS**

The Institute recommends that each mercury cell chlor-alkali production facility that performs on-site repairs of rubber-lined cell parts have a written program for handling of such parts to protect against worker exposure to potentially harmful levels of mercury.

The Institute also recommends that each mercury cell chlor-alkali production facility that performs or contracts for off-site repairs of rubber-lined cell parts takes reasonable steps to ensure that the facility where the repairs are being performed has a written program for handling of such parts to protect against worker exposure to potentially harmful levels of mercury. This policy should be accessible to all affected employees. The policy should be reviewed with affected employees before they work on any mercury cell rubber-lined parts.

The following topics should be addressed in the written program to protect potentially affected personnel from harmful levels of mercury exposure:

- shipping procedures (if done off-site)
- handling procedures
- safe work practices
- spill prevention and control
- hazard communication
- employee health protection

The policy should be reviewed on a periodic basis and modified as necessary.

3. SHIPPING OF CELL PARTS FOR OFF-SITE MAINTENANCE

When shipping rubber-lined cell parts potentially contaminated with mercury to an off-site facility for repairs, the chlor-alkali production facility should ensure that the parts are shipped in containers designed to prevent leakage of any mercury present to the environment. It is recommended that such containers be constructed of, or lined with, a material impervious to mercury.

Prior to shipment, the chlor-alkali production facility should remove and recover any visible mercury from the rubber-lined cell parts. One technique for recovering mercury is vacuuming. Techniques to remove mercury include pressure washing or chemical treatment. To the extent possible, cracked or spalled sections of rubber-lining should be removed before shipment to facilitate removal of trapped mercury.

It should be noted that mercury can resurface and condense on parts and drop into the shipping container during shipment. Mercury found in a shipping container should be recovered and containerized to the extent possible and returned to the chlor-alkali facility for reuse.

Upon receipt of the rubber-lined cell parts, the repair facility should continue to store the parts in the shipping containers until repairs are made. Mercury found on the cell parts by the repair facility should be recovered to the extent possible. The Institute recommends that the repair facility have arrangements with the chlor-alkali production facility to return mercury.

Any shipment of recovered mercury must be in accordance with DOT regulations.

4. HAZARD COMMUNICATION

4.1 GENERAL

The industrial environment has evolved in recent years reflecting the knowledge gained from industrial hygiene monitoring. The use of chemicals in the work place has come under ever increasing scrutiny. Employees have the right to information concerning the health and safety risks associated with the chemical exposures experienced while at work. Employers address these concerns with formal "Hazard Communication Programs."

4.2 OSHA LEGISLATION

The Federal Occupational Safety and Health Administration has issued regulations that define the minimum requirements for employers when developing a "Hazard Communication Program" (HAZCOM). The regulations require that the information concerning the hazards associated with the use of a chemical must flow from the manufacturer, supplier or importer to the affected employee.

The OSHA requirements for a Hazard Communication Program are set forth in 29CFR 1910.1200 of the Code of Federal Regulations. The HAZCOM Program features topics such as:

- definitions for related subjects;
- an outline for a written program;
- an explanation of the use of a Material Safety Data Sheet (MSDS); and
- definitions for terms used in an MSDS.

4.3 APPLYING HAZCOM TO RUBBER LINING CELL PARTS

The process of rehabilitating cell parts for reuse by the mercury chlor-alkali industry requires that employees remove rubber from the steel bodies. The rubber lining has been exposed to the cell environment and is therefore potentially contaminated with mercury. Although the cell parts are cleaned of visible traces of mercury prior to transport to the rubber lining facility, minute droplets of mercury could be trapped within the rubber lining and could be released as the rubber lining is stripped from the cell part. This mercury could evaporate and could expose employees to concentrations of mercury vapor that would require appropriate respiratory protection. Each rubber lining facility should identify exposure to mercury vapor in the site specific HAZCOM.

5. EMPLOYEE HEALTH PROTECTION

When removing rubber from mercury cell rubber-lined parts, it is important that respiratory protection appropriate for mercury exposure be worn by potentially affected employees. Special protection may be needed when applying heat to rubber-lined cell parts due to the volatility of mercury.

The Institute recommends that a program of monitoring breathing-zone air mercury concentration be in place and documented for potentially affected employees. The Institute also recommends that a program of monitoring the body-burden of mercury (i.e., mercury in urine monitoring) be in place and documented for potentially affected employees. A medical surveillance program and the use of respiratory protection equipment that are appropriate for the magnitude of mercury exposure should be implemented. Reference 8.1 is an Institute publication that provides recommendations for medical surveillance and hygiene monitoring practices for chlor-alkali employees potentially exposed to mercury.

The concentration of vapor within the breathing zone of a person whose clothing, hair, or skin is contaminated with small quantities of elemental mercury may be significantly elevated above ambient background concentrations in the general work environment. Area ventilation can be used to reduce breathing zone mercury concentrations. In addition, shoes and/or clothing contaminated with mercury transported into clean areas including those away from work may result in additional exposure to the employee or possibly to family members. As a result contaminated materials (e.g., clothing, tools) should be isolated and kept at the workplace. Area ventilation can be used to reduce breathing zone mercury concentrations.

Food, cigarettes and other tobacco products can absorb mercury from the air. To prevent these items from being sources of mercury exposure, they should be prohibited from areas where mercury may be present.

Skin, hair, and clothing contaminated with mercury can be significant sources of exposure to vapor. Therefore, high standards of individual cleanliness and personal hygiene should be prescribed and maintained.

Hands should be washed thoroughly and, if necessary, scrubbed with a soft brush before eating or smoking. Fingernails should be kept clean as mercury under the nails can be a source of exposure when hands are brought near the nose and/or mouth. Depending on the potential for exposure to mercury, consideration should be given to requiring employees to shower and shampoo at the end of the work shift.

6. ENVIRONMENTAL RECOMMENDATIONS

6.1 HANDLING RUBBER-LINED CELL PARTS AND RUBBER REMOVAL

Care should be taken to minimize the potential for releasing mercury into the environment. A contained area with a non-porous surface or lined with a non-porous material should be used for handling cell parts and removing them from shipping containers. Avoid spilling any mercury outside the contained area. The reportable quantity for mercury released into the environment, as established by CERCLA, is 1 pound. [Reference 8.3]

Any spilled mercury should be collected and containerized immediately using proper PPE and appropriate clean up devices (i.e., mercury vacuums and/or commercially available spill kits). Any mercury recovered should be returned to the chlor-alkali facility for reuse.

Removal of rubber from used cell parts should be done within the contained area. Mercury should not be removed from cell parts into a non contained area using high-pressure air, water, or other means. Washing of rubber-lined parts should be conducted so that rinsate is handled in accordance with applicable regulations.

The contained area should be maintained free of visible mercury and inspected regularly for signs of visible mercury. Any mercury found should be collected and returned to the chlor-alkali facility for reuse.

Heating of rubber-lined cell parts should not be done if any visible mercury is present.

6.2 DISPOSAL OF REMOVED RUBBER

The relining facility must determine if material removed from cell parts is a hazardous waste. The removed material would be defined as a hazardous waste if the leachable mercury concentration analyzed by the Toxicity Characteristic Leaching Procedure (TCLP), is greater than or equal to 0.2 mg/l. See Reference 8.4.

If the removed material is determined to be a hazardous waste, it must be managed as a hazardous waste. The facility may need to obtain a Hazardous Waste Generator Identification Number, and the waste must be disposed of in accordance with all applicable RCRA regulations. Small quantity generators may be exempt from many of the requirements. See Reference 8.5.

7. AUDITING

The Institute recommends that any chlor-alkali production facility using an off-site facility to repair rubber-lined cell parts conduct periodic audits of the repair facility. Such an audit should include a review of the following:

- hazard communication
- employee health protection
- employee training
- compliance with environmental regulations
- compliance with transportation regulations

Audit results should be promptly reviewed with the repair facility. The parties should discuss a plan and schedule for addressing any audit findings.

Facilities performing rubber-lined removal and/or repair activities on site should conduct similar such audits.

8. REFERENCES

- 8.1 *Guidelines: Medical Surveillance and Hygiene Monitoring Practices for Control of Worker Exposure to Mercury in the Chlor-Alkali Industry*, ed. 3; Pamphlet 125; The Chlorine Institute: Washington, DC, **1994**.
- 8.2 *Environmental Fate and Toxicity of Mercury*, ed. 1; Pamphlet 92; The Chlorine Institute: Washington, DC, **1992**.
- 8.3 40 CFR Part 302; Designation, Reportable Quantities and Notification Requirements of CERCLA.
- 8.4 Test Method 1311 in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.
- 8.5 40 CFR Part 262; Standards Applicable to Generations of Hazardous Waste.

APPENDIX A CHECKLIST

This checklist is designed to emphasize major topics for someone who has already read and understood the pamphlet. Taking recommendations from this list without understanding related topics can lead to inappropriate solutions.

Place a check mark (✓) in the appropriate box below.

Yes	No	N/A		
9	9	9	1.	Does the facility have a written program in place for the handling of mercury cell rubber-lined parts? [2]
9	9	9	2.	Are rubber-lined cell parts shipped off-site for repair, shipped in containers designed to prevent leakage of mercury? [3]
9	9	9	3.	Are visible mercury and loose rubber materials removed from rubber-lined cell parts prior to shipment? [3]
9	9	9	4.	Does the repair facility continue to store the rubber-lined cell parts in the shipping containers until repairs are made? [3]
9	9	9	5.	Do the repair facility and the production facility have an arrangement in place for the return of mercury that may be found in a shipping container? [3]
9	9	9	6.	Does the repair facility's HAZCOM identify potential exposure to mercury? [4.3]
9	9	9	7.	Does the repair facility have in place an appropriate industrial hygiene medical surveillance program for potential mercury exposure? [5]
9	9	9	8.	Are rubber-lined cell parts potentially contaminated with mercury handled in a contained area? [6.1]

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| 9 | 9 | 9 | 9. | Is a procedure in place that disallows the heating of rubber-lined cell parts if visible mercury is present? [6.1] |
| 9 | 9 | 9 | 10. | Has the repair facility made a determination whether any wastes generated are hazardous? [6.2] |
| 9 | 9 | 9 | 11. | Does the production facility conduct periodic audits of the repair facility? [7] |